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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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J. Britton Zabka

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03/31/2003

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,408

Applicant(s)

ZABKA, J. BRITTON

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12, 15-20, 23-35, 37 and 38 is/are pending in the application.
- 4a) Of the above claim(s) 23, 24 and 27-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12, 15-20, 25, 26, 37 and 38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on January 21, 2003, which has been entered as paper number 7.
- By this amendment, the applicant has amended claims 1, 15 and 25.
- Claims 23-24 and 27-35 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 4.
- Claims 1-9, 12, 15-20 and 25-26 and 37-38 are treated as the elected claims.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-9, 12, 15-20, 25 and 26 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "substantially identical" recited in claim 1 is indefinite since it is not clear what is considered to be "substantially" identical since no definite degree of identical is being stated here.

The phrase "means for dividing" have been referred to different means in the claims, subsequently the phrases are confusing and indefinite since it is not clear which one is referred to when the phrase is stated in the different dependent claims. Clarifications are required.

The phrase "also including means for opening also including means for opening" recited in claim 15 is confusing and in error. Clarification is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-4, 7-9, 12, 15-20, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Bencze et al (PN. 4,212,536) in view of the patent issued to Klug et al (PN. 6,266,167).**

Bencze et al teaches a *holographic recording system* that is comprised of a *light source* (1, Figure 5), for generating coherent light, a *beam splitter* (5), serves as means for dividing the coherent light to *object beam* (6) and *reference beam* (7) each having a beam path as shown in Figure 5, a *photomask* (28) serves as the means for positioning an image in the object beam path, a *recording medium* (26), implicitly be supported by a means for supporting in both the object beam and reference beam path so that the photomask as the object can be recorded as hologram (25) on the recording medium. Bencze et al further teaches that a *set of beam splitters* (26, 39 and 42) placed in the reference beam path serves as *the means for dividing the reference beam* (7) into *at least three reference beams* (38, 41, 44) such that the reference beams are directed to the recording medium at *different angle* to form different hologram of the object on the recording medium. Bencze et al teaches that each of the reference beams is controlled by a shutter (37, 40 and 43) and the object beam is controlled by a shutter (3) so that individual light beam may be controlled to allow to pass or to be blocked. These shutters serve as the *plurality of shutter means*, (please see Figure 5, column 7). Holographic recording process includes holographic printing process.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the shutter for the object beam is placed between the means for dividing and the recording medium. Klug et al in the same field of endeavor teaches a holographic recording apparatus wherein a shutter means (225, Figure 7) is placed at the object beam path between the beam splitter (205) and the recording medium at holding means (300, Figure 7). It would have been obvious to one skilled in the art to apply the teachings of Klug et al modify the arrangement of Bencze et al to put the shutter at the object beam path between the beam splitter and the recording medium for the benefit of allowing individual control of the object beam without effecting the light beam generated to other part of the apparatus.

With regard to claims 2-4, and 7-9, Bencze et al does not teach explicitly that the means for dividing is a plurality of optical fibers. Klug et al in the same field of endeavor teaches that the light beams for recording holograms may be transmitted by using optical fibers and fiber optic beam splitters are used as the beam dividing means. The fiber optic beam splitters are based on the ideas to have a plurality of fibers contacting each other and coupling the light from the fibers, (please see column 10, lines 40-46). With regard to claim 3, the beam paths for the reference and object beams are of certain path length. With regard to claims 4, and 7-9, Klug et al teaches that the fibers for directing the reference beam and object beam may be supported by a *translation system* (such as 600, Figures 14 and 17) in a *beam steering system* (400) for supporting the fibers and steering the beams so that the angular orientations of the beams may be adjusted. The output ends of the fibers are of equal optical path to the recording medium in order for the holograms to be recorded have the same spatial phase difference. It would then have been obvious to one skilled in the art to apply the teachings of Klug et al to modify the holographic recording apparatus of Bencze et al to use fiber optics as means for translating the reference beams and object beams for the benefit of providing more efficient and flexible arrangement of the object beam path and reference beam path and even beam steering property to better control and adjust the orientations of the recording beams.

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With regard to claims 15-16, Bencze et al teaches that the shutters are electromechanical shutters, which implicitly includes control means so that shutters for the reference beams may be sequentially open one at the time with the opening the shutter for the object beam in order to record the holograms sequentially. Klug et al teaches that shutters (225) may be of mechanical one or electro-optic one such as liquid crystal shutter, (please see column 10, lines 60-64). It would then have been obvious to one skilled in the art to apply the teachings of Klug et al to make the shutter an liquid crystal shutters for the benefit of providing an alternative shutters means to the system.

With regard to claims 17-20, Bencze et al does not teach explicitly that the image positioning means is either a holder for transparency or liquid crystal panel. Klug et al teaches that the object image is provided by spatial light modulator (90), which is known in the art includes liquid crystal panel. Klug et al also teaches that the image may be supplied by a computer control, (230, please see Figure 7). It would then have been obvious to one skilled in the art to apply the teachings of Klug et al to modify the arrangement of Bencze et al to make the object image holding and supplying means a spatial light modulator and computer for the benefit of providing better manipulation of the object image.

With regard to claim 25, Klug et al teaches that the reference beams may be manipulated by beam steering lens (405, Figure 17).

5. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Bencze et al and Klug et al as applied to claim 1 above, and further in view of the patent issued to Kitamura (PN. 5,949,931).

The holographic recording apparatus taught by Bencze et al in combination with the teachings of Klug et al as applied for claim 1 above have met all the limitations of the claims. These references however do not teach explicitly that fused fiber and means for dividing the fused fiber into a plurality of optical fibers. However optic fiber beam splitter for dividing fused optical fibers into a plurality of

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optical fibers are well known in the art as demonstrated by the teachings of **Kitamura** wherein fused multimode fiber (4) is divided into a plurality of single mode fibers (5, Figure 2). It would then have been obvious to one skilled in the art to apply the teachings of **Kitamura** to modify the optic fiber beam splitter for the benefit of efficiently splitting up light in single fiber into a plurality of fibers.

6. **Claim 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Bencze et al and Klug et al as applied to claim 1 above, and further in view of the patent issued to Psaltis et al (PN. 5,671,073).**

The holographic recording apparatus taught by Bencze et al in combination of the teachings of Klug et al as described for claim 1 above have met all the limitations of the claims. These references teach that the plurality of light beams may be modulated but it does not teach explicitly that the modulation means is a cylindrical lens. However cylindrical lens has been applied in the art to modulate the light beam to shift it to certain spot or location of the recording medium to provide desired multiplexing or slit image as taught by *Psaltis* et al wherein a cylindrical lens (20) is used to modulate the reference beam to provide shift-selectivity, (please see column 11). It would then have been obvious to one skilled in the art to apply the teachings of *Psaltis* et al to modify the recoding apparatus of Bencze et al for the benefit of providing desired modulation to reference beams to provide desired shift-selectivity of the recording apparatus.

7. **Claims 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Bencze et al in view of the patent issued to Hart (PN. 6,151,141).**

Bencze et al teaches a holographic recording system that is comprised of a light source (1), for generating coherent light, a beam splitter (5), serves as means for dividing the coherent light to object beam (6) and reference beam (7) each having a beam path as shown in Figure 5, a photomask (28) serves

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as the means for positioning an image in the object beam path, a recoding medium (26), implicitly be supported by a means for supporting in both the object beam and reference beam path so that the photomask as the object can be recorded as hologram (25) on the recording medium. Bencze et al further teaches that a set of beam splitters (26, 39 and 42) placed in the reference beam path serves as the means for dividing the reference beam (7) into at least three reference beams (38, 41, 44) such that the reference beams are directed to the recording medium at different angle to form different hologram of the object. Bencze et al teaches that each of the reference beams is controlled by a shutter (37, 40 and 43) and the object beam is controlled by a shutter (3) so that individual light beam may be controlled to allow to pass or to be blocked. The control of the shutters allows the object beam to expose the holographic recording medium simultaneously with different reference beam at different time. Holographic recording process includes holographic printing process.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the images being recorded are obtained by changing the image in the object beam. Hart in the same field of endeavor teaches to use projection means with liquid crystal panel to provide a plurality of different data slices to be displayed on the liquid crystal panel to provide different or changed object information to the object beam. It would then have been obvious to one skilled in the art to apply the teachings of Hart to provide means for changing different image information for the object to be recorded as hologram.

Response to Arguments

8. Applicant's arguments with respect to claims 1, 12, 15-20, 25, 26, 37 and 38 are have been considered but are moot in view of the new ground(s) of rejection.

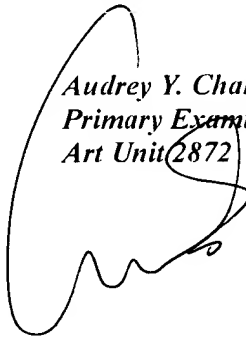
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.
March 26, 2003